# Research profile for applicants

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| Name of DKFZ research division/group: | ***Division of Medical Physics in Radiology (E020)*** |
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| Group homepage:<br>*Visit this website for further information on current research and recent publications.* | ***www.dkfz.de/en/medphysrad*** |

## RESEARCH PROFILE AND PROJECT TOPICS

The Division of Medical Physics in Radiology develops new methods for imaging-based diagnostic and therapeutic procedures. We are currently looking to strengthen our research focuses on novel hardware as well as software-based acquisition and reconstruction strategies for magnetic resonance imaging (MRI), including machine learning. The goal is to improve and individualize cancer patient treatment by acquiring quantitative biomedical information about tumors and metastases with MRI. For example, we utilize powerful magnetic fields (7 or 9.4 Tesla) to depict the distribution of sodium, oxygen, potassium, and chlorine inside the body. We also utilize hyperpolarization of carbon in various chemical substrates, which are injected into the body and measured with MRI to capture metabolic processes. By optimizing MRI diffusion techniques, we have been able to greatly improve the diagnostic accuracy of breast cancer screening. A further emerging MR imaging contrast is provided by Chemical Exchange Saturation Transfer (CEST) imaging, which allows detection and measurement of glucose or mobile proteins. Finally, we are pursuing methods to enhance MR-based guidance of radiotherapy procedures. If you feel you could contribute to these efforts, we welcome your application.